

A new species of *Lechytia* from eastern Australia (Pseudoscorpiones: Lechytiidae)

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Abstract – The first Australian representative of the chthonioid family Lechytiidae, *Lechytia libita* new species, is described from Queensland where it appears to favour tree bark microhabitats in rainforest habitats.

INTRODUCTION

Members of the family Lechytiidae have a sporadic distribution around the world with ten species recorded from the Americas, six species from Africa, one species from Turkey and five species from Asia and the Pacific region (Harvey 1991), extending as far east as Hawaii (Muchmore 2000). The sole genus *Lechytia* Balzan has usually been placed in its own tribe (e.g., Beier 1932; Chamberlin 1929; Muchmore 1975) or subfamily (Morikawa 1960; Murthy and Ananthakrishnan 1977) within the Chthoniidae, but Harvey (1992) proposed the Lechytiidae as a family distinct from the remainder of the extant Chthonioidea, the Chthoniidae and Tridenchthoniidae. Muchmore (1975, 2000) divided the genus into two species-group, the *L. arborea* species-group for *L. arborea* Muchmore, *L. sini* Muchmore and *L. sakagamii* Morikawa, and the *L. hoffi* species-group for *L. hoffi* Muchmore. The type species *L. chthoniiformis* (Balzan 1887) was recognised as a member of the *L. arborea* group by Mahnert (2001), but the remaining species of the genus have not yet been placed. A new species of *Lechytia* has been recently detected in eastern Australia which extends the distribution of the family for the first time into the Australian region. This new species is the subject of this paper.

The specimens examined as part of this study are lodged in the Queensland Museum, Brisbane (QM) and the Western Australian Museum, Perth (WAM). Specimens were examined using dilute lactic acid under a compound microscope, and all have been returned to ethanol. Terminology largely follows Chamberlin (1931) and Harvey (1992). In particular, I have followed the naming conventions applied by Harvey (1992) based upon perceived homologies in the trichobothria. In this case, this affects the names of the trichobothria of the movable finger which are here termed *st*, *sb*, *b* and *t* (from the most basal to the most distal). In previous systems they are termed *b*, *sb*, *st* and *t*.

SYSTEMATICS

Family Lechytiidae Chamberlin, 1929

Genus *Lechytia* Balzan, 1892

Lechytia Balzan 1892: 499; Harvey 1991: 186 (full synonymy).

Type species

Roncus chthoniiformis Balzan, 1887, by original designation.

Remarks

Members of the family Lechytiidae share a number of unusual features, the most peculiar of which is the arrangement of the trichobothria where *eb* and *esb* are situated on the dorsum of the chelal hand. In all other chthonioids, these trichobothria are situated at the base of the chelal finger. This feature will serve to distinguish them from all other chthonioids.

Species of *Lechytia* have been recorded from many parts of the world (Harvey 1991), including South and central America [*L. chthoniiformis* (Balzan, 1887), *L. chilensis* Beier, 1964, *L. delamarei* Vitali-di Castri, 1984, *L. kuscheli* Beier, 1957, *L. martiniquensis* Vitali-di Castri, 1984 and *L. trinitatis* Beier, 1970], North America (*L. arborea* Muchmore, 1975, *L. cavicola* Muchmore, 1973, *L. hoffi* Muchmore, 1975 and *L. sini* Muchmore, 1975), Asia (*L. anatolica* Beier, 1965, *L. asiatica* Redikorzev, 1938, *L. himalayana* Beier, 1974, *L. indica* Murthy and Ananthakrishnan, 1977 and *L. madrasica* Sivaraman, 1980), Africa [*L. dentata* Mahnert, 1978, *L. garambica* Beier, 1972, *L. leleupi* Beier, 1959, *L. maxima* Beier, 1955b, *L. natalensis* (Tullgren, 1907) and *L. serrulata* Beier, 1955a] and the Pacific region (*L. sakagamii* Morikawa, 1952). A single species, *L. tertiaria* Schawaller, 1980, has been described from Tertiary Amber deposits in the Dominican Republic (Schawaller, 1980). The species described below is the first to be found in Australia.

Lechytiya libita sp. nov.

Figures 1–14

Material examined

Holotype

♂, Windsor Tableland, Queensland, AUSTRALIA, 16°16'S, 145°08'E, 1160 m, site 2, pyrethrum, 27 December 1988, E. Schmidt and ANZSES (QM S17220).

Paratypes

AUSTRALIA: Queensland: 1 ♀, same data as holotype (QM S67680); 1 ♀, Oakview State Forest, summit, 26°10'S, 152°20'E, 600 m, pyrethrum on trees, rainforest, 26 May 2002, G. Monteith (QM S64848); 2 ♀, Pearamon Scrub, 17°19'S, 145°37'E, 750 m, pyrethrum on trees, 9 December 1995, G. Monteith (QM S45776); 1 ♂, Mt Fort William, 6 km NE. of Kalpower, 24°39'S, 151°20'E, 700 m, pyrethrum, rainforest, 18 September 1989, G.B. Monteith (QM S41073); 3 ♂, 3 ♀, Bauple State Forest, 25°52'54"S, 152°37'12"E, tree hollow, 12 January 2001, M. Shaw (WAM T62601).

Diagnosis

Trichobothria *sb* and *b* (formerly *sb* and *st*) separated by about 1 areolar diameter; chelal teeth reduced to a lamina for most of finger length; chela 0.419–0.435 (♂), 0.462 (♀) mm in length, and 4.11–4.22 (♂), 3.76 (♀) times longer than broad; chelal hand 0.200 (♂), 0.210 (♀) mm in length.

Description

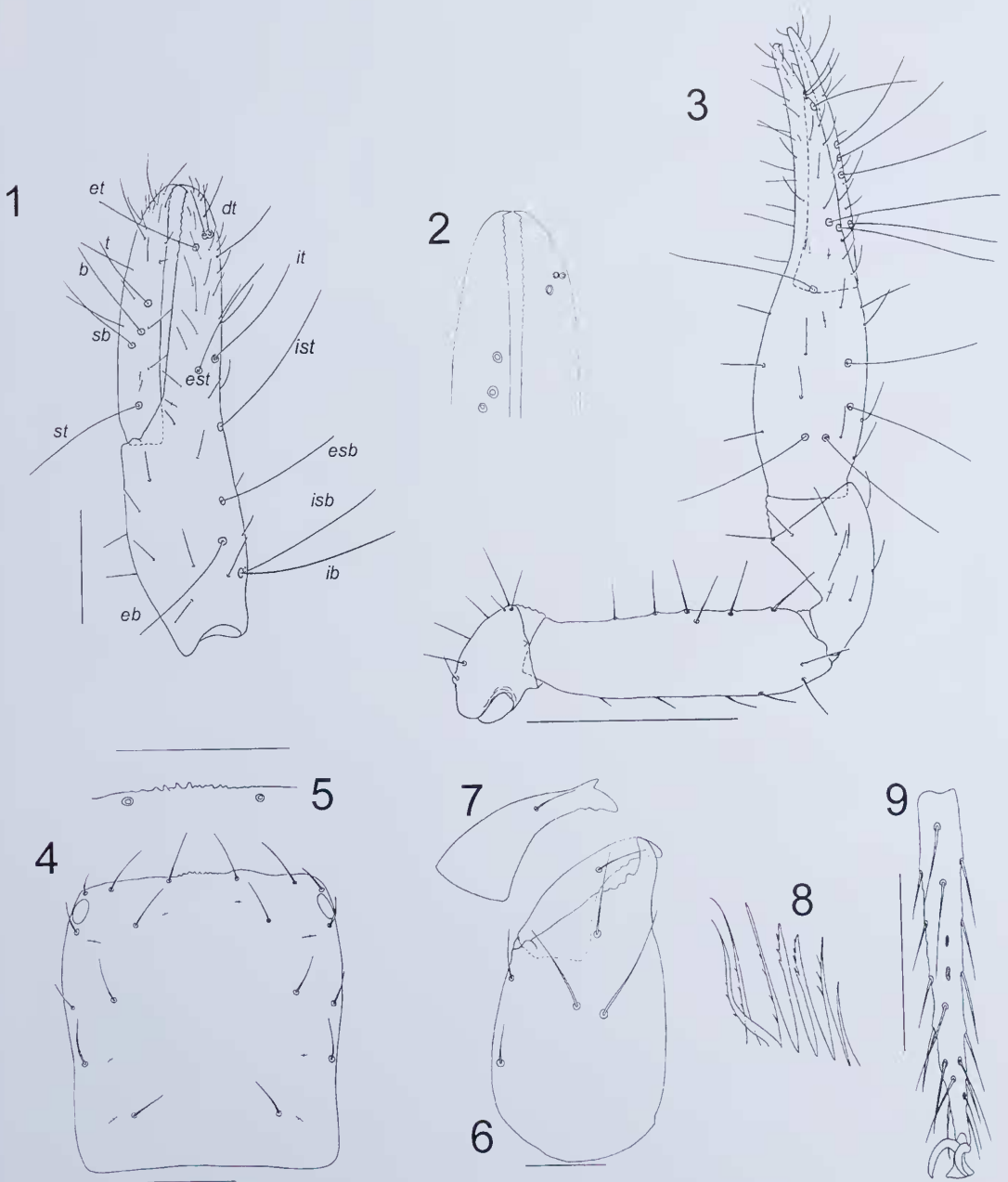
Adult: Colour pale brown. Pedipalp (Figures 1–3): trochanter 1.64–1.66 (♂), 1.55 (♀), femur 3.29–3.74 (♂), 3.17–3.90 (♀), patella 1.65–1.86 (♂), 1.60–1.90 (♀) and chela 4.08–4.36 (♂), 3.75–3.94 (♀) times longer than broad; chelal hand 1.86–1.96 (♂), 1.71–1.88 (♀) times longer than broad; movable chelal finger 1.24–1.35 (♂), 1.20–1.35 (♀) times longer than hand; femur with anterior face flattened so that a faint keel is present on the antero-dorsal and antero-ventral margins; chelal fingers with approximately 7 distal teeth, remaining teeth obsolete, fused into a lamina (Figure 1); fixed chelal finger and hand with 8 trichobothria, movable chelal finger with 4 trichobothria (Figure 1); *ib*, *isb*, *eb* and *esb* on dorsum of hand; *ib* and *isb* situated basally; *eb* and *esb* situated medially; *b* situated slightly closer to *sb* than to *t*; *b* and *sb* only about one areolar diameter apart; *xs* situated slightly distal to *et* near tip of fixed finger, each hair shorter than those of other trichobothria; venom apparatus absent. Chelicera (Figures 6, 7) with 5 setae on hand and 1 medial seta on movable finger; fixed finger with 3 small teeth, the distal-most tooth largest; movable finger much shorter than hand, with 2 small teeth; flagellum (Figure 8) consisting of 7 blades, the

subdistal blade strongly recumbent, others straight; galea of ♂ absent, that of ♀ a short rounded nubbin. Carapace (Figure 4) with 2 small corneate eyes; anterior margin finely denticulate (Figure 5); with 18 setae arranged 6: 4: 4: 2: 2; the pre-ocular seta about 50% length of other setae in anterior row; with 4 pairs of lyrifissures, one pair situated antero-medially, the second pair situated interno-lateral to the eyes, the third pair situated slightly interior to the sole pair of setae of the intermediate row, and the fourth pair situated exterior to the sole pair of setae of the posterior row. Tergites and sternites undivided; tergal chaetotaxy ♂, 6: 5–6: 5–6: 6: 6: 6: 6: 6: 4: 1T2T1: 0; ♀, 6: 6: 6: 6: 6: 6: 6: 6: 4: 1T2T1: 0; sternal chaetotaxy ♂, 10–11: (3)32–33(3): (3)8–10[4+4](3): 10: 7–8: 8: 8: 8: 2TT2: –: 2; ♀, 6: (3)6(3): (3)8(3): 10: 8: 8: 8: 8: –: 2. All setae bordering male sternite III bifurcate or trifurcate (Figure 13). Genitalia of male not studied in detail; of female weakly sclerotized with U-shaped frame. Pleural membrane smoothly plicate. Coxal chaetotaxy (Figure 10): ♂, 2+3: 4: 4–5: 4–7: 7; ♀, 2+3: 4: 5: 6–7: 7; manducatory process with 2 distal setae, about equal in length (Figure 10), the distal seta terminally bifurcate (Figure 11), plus an additional 3 setae situated close to trochanteral foramen; coxal spines and intercoxal tubercle absent (Figure 10); coxa I with small, triangular apical projection with single seta situated at base (Figure 12); other setae on coxa I situated near trochanteral foramen. Legs robust, femur+patella IV 2.03 (♂), 1.96 (♀) times longer than deep; heterotarsate; tarsi with two elongate gland openings along dorsal surface (see Muchmore 2000) each with crenulate margins (Figure 9); arolium slightly shorter than claws (Figure 9), claws simple.

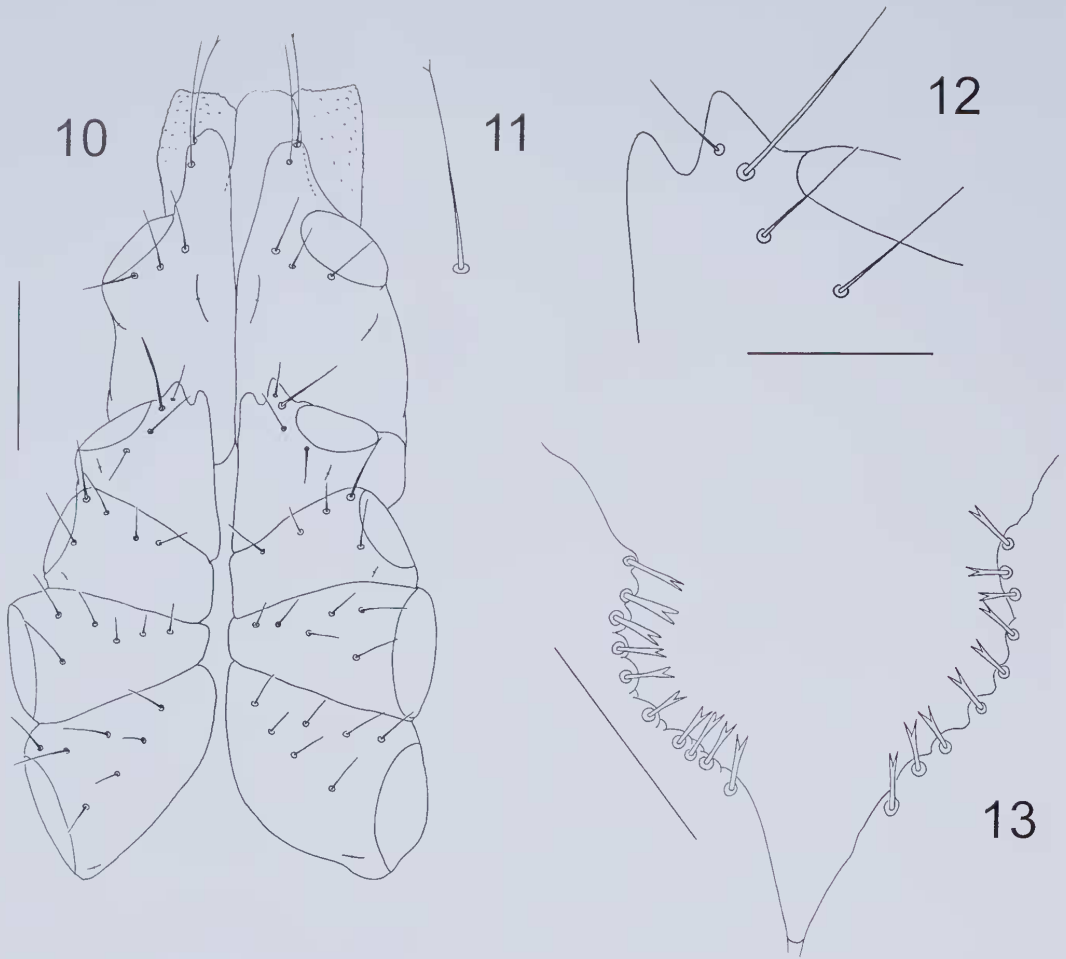
Dimensions (mm)

Males: Holotype (QM S17220) followed by other males (where applicable): Body length 1.17 (0.88–0.98). Pedipalps: trochanter 0.123/0.074, femur 0.288/0.077 (0.265–0.28/0.073–0.082), patella 0.160/0.092 (0.138–0.160/0.080–0.097), chela 0.435/0.103 (0.395–0.419/0.092–0.102), hand length 0.200 (0.175–0.200), movable finger length 0.256 (0.235–0.260). Chelicera 0.211/0.115, movable finger length 0.112. Carapace 0.315/0.307 (0.29–0.31/0.253–0.286); eye diameter 0.031. Leg I: femur 0.178/0.046, patella 0.090/0.053, tibia 0.109/0.035, tarsus 0.186/0.028. Leg IV: femur + patella 0.320/0.157, tibia 0.208/0.093, metatarsus 0.112/0.051, tarsus 0.186/0.029.

Females: Paratype (QM S67680) followed by other females (where applicable): Body length 1.22 (1.06–1.20). Pedipalps: trochanter 0.129/0.083, femur 0.304/0.096 (0.285–0.320/0.085–0.090), patella 0.166/0.104 (0.159/0.091–0.100), chela 0.462/0.123 (0.415–0.455/0.110–0.120), hand length 0.210 (0.198–0.225), movable finger length 0.262 (0.240–0.275). Chelicera 0.223/0.122, movable finger length 0.127. Carapace



Figures 1-9 *Lechyti libita*, sp. nov., holotype male unless stated otherwise: 1, left chela; 2, detail of distal portion of fingers; 3, right pedipalp; 4, carapace; 5, epistome; 6, chelicera; 7, movable cheliceral finger (paratype female); 8, flagellum; 9, right tarsus I (paratype female). Scale lines: 0.05 mm (Figures 6, 7); 0.1 mm (Figures 1, 4, 5, 9); 0.2 mm (Figure 3).



Figures 10–13 *Lechytiya libita*, sp. nov., holotype ♂ unless stated otherwise: 10, coxal region (paratype female); 11, distal seta of manducatory process; 12, left coxa I (paratype female); 13, male genital atrium. Scale lines: 0.05 mm (Figure 12); 0.1 mm (Figures 10, 13).

0.352/0.328 (0.290–0.340/0.285–0.345); eye diameter 0.023. Leg I: femur 0.188/0.051, patella 0.103/0.458, tibia 0.109/0.036, tarsus 0.186/0.026. Leg IV: femur + patella 0.315/0.161, tibia 0.224/0.070, metatarsus 0.122/0.056, tarsus 0.198/0.269.

Remarks

Lechytiya libita belongs to the '*L. arborea*' species-group as defined by Muchmore (1975), as the distal seta of the pedipalpal coxa is bifurcate (Figure 11), the chelal teeth are strongly reduced (Figure 1), tergite XI has a chaetotaxy of 1T2T1, the male galea is much reduced in comparison with the female (Figures 6, 7) and the tarsal gland openings are enlarged and possess crenulate margins (Figure 9) (Judson 1992; Muchmore 2000). It is most similar to those species of *Lechytiya* in which trichobothria *sb* and *b* are slightly separated from each other, usually

by about one areolar diameter, but it differs from all of these species by its smaller size: *L. chilensis* from Chile [e.g., chelal hand 0.24 mm (♀)], *L. kuscheli* from Juan Fernandez Island [e.g. chelal hand 0.25–0.26 mm (♂), 0.285 mm (♀)], *L. serrulata* from Zaire [e.g., chelal hand 0.24 mm (♂)], *L. maxima* from Kenya [e.g., chelal hand 0.28 mm (♂, ♀)], and *L. cavicola* from Mexico [e.g., chela length 0.51–0.52 mm (♂), 0.51 mm (♀), chelal hand 0.235–0.25 mm (♂), 0.24 mm (♀)]. In addition, the chelal teeth are reduced to a thin lamina in *L. libita*, *L. chilensis*, *L. kuscheli*, and *L. cavicola*, but are well-defined in *L. serrulata* and *L. maxima*. *Lechytiya libita* also differs from some of the lamina-bearing species by the relative dimensions of the chela: *L. chilensis* has a chela which is 4.8 (♀) times longer than broad, while the chela of *L. kuscheli* is 4.8 (♂), 4.3 (♀) times longer than broad; *L. libita* has a chela

that is 4.11–4.22 (δ), 3.76 (φ) times longer than broad. Geographically, *L. libita* is closest to *L. sakagamii* from the Pacific region and *L. asiatica* Redikorzev from Vietnam. It differs from *L. sakagamii* by the relative positions of trichobothria *sb* and *b*, which are separated by about one areolar diameter in the Australian species and by about half an areolar diameter in *L. sakagamii* (Beier 1957: figure 3c; Morikawa 1960: plate 7, figure 10; Muchmore 2000: figure 5b). *Lechyti libita* also differs from *L. asiatica* in the positions of *sb* and *b*, which are contiguous in *L. asiatica* [Dr Mark Judson, in litt., has kindly examined the two syntypes (1 δ , 1 φ) of *L. asiatica* which are lodged in Muséum national d'Histoire Naturelle, Paris].

Distribution

Lechyti libita is the first member of the genus to be found in Australia and has been recorded from rainforest habitats in eastern Queensland (Figure 14). All available records suggest that *L. libita* is a corticolous species as all known specimens were taken from tree habitats. Whilst a corticolous habitat is generally unusual for chthonioid pseudoscorpions – they are more abundant in leaf litter and soil – a corticolous environment is not unknown amongst lechytiids. *Lechyti arborea* has been collected from “base of leaf of cabbage palm” and “beating foliage” from south-eastern U.S.A., whilst some nymphs that were tentatively assigned to the species were collected from beneath the “bark of a pine tree” at two different locations in Florida

(Muchmore 1975). Some of the type material of *L. anatolica* from Turkey was taken under bark of a rotting pine (Beier 1965), and *Lechyti delamarei* was collected under bark on Guadeloupe (Vitali-di Castri 1984). *Lechyti himalayana* has been taken from the bark of *Rhododendron* and *Abies* (Schawaller 1987).

Etymology

The specific epithet is a Latin noun alluding to the pleasure of finding the first species of *Lechyti* in Australia (*libitus*, Latin, pleasing, agreeable).

ACKNOWLEDGEMENTS

I am very grateful to Robert Raven and Owen Seeman who kindly provided access to the collections of the Queensland Museum, Matthew Shaw for the donation of the Bauple State Forest specimens, to Mark Judson (Muséum national d'Histoire naturelle, Paris) for providing information regarding the syntypes of *L. asiatica*, and to Mark Judson and Volker Mahnert for their constructive comments on a draft of the manuscript.

REFERENCES

- Balzan, L. (1892). Voyage de M. E. Simon au Venezuela (Décembre 1887 – Avril 1888). Arachnides. Chernetes (Pseudoscorpiones). *Annales de la Société Entomologique de France* 60: 497–552.

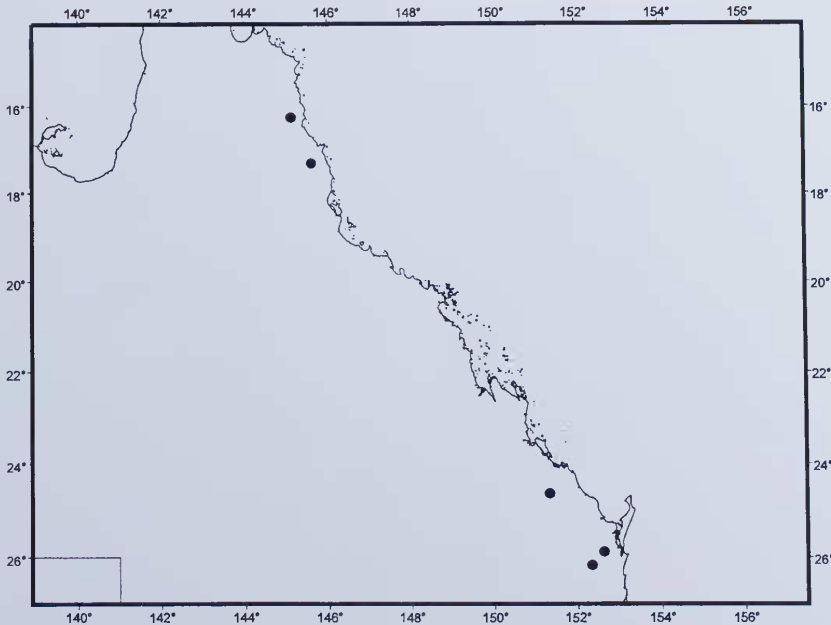


Figure 14 Distribution of *Lechyti libita*, sp. nov.

- Beier, M. (1932). Pseudoscorpionidea I. Subord. Chthoniinea et Neobisiinea. *Tierreich* 57: i-xx, 1-258.
- Beier, M. (1957). Pseudoscorpionida. *Insects of Micronesia* 3: 1-64.
- Beier, M. (1965). Anadolü'nun Pseudoscorpion faunasi. Die Pseudoscorpioniden-Fauna Anatoliens. *Istanbul Üniversitesi Fen Fakültesi Mecmuası* 29B: 81-105.
- Chamberlin, J.C. (1929). A synoptic classification of the false scorpions or chela-spinners, with a report on a cosmopolitan collection of the same. Part 1. The Heterosphyronida (Chthoniidae) (Arachnida-Chelonethida). *Annals and Magazine of Natural History* (10) 4: 50-80.
- Chamberlin, J.C. (1931). The arachnid order Chelonethida. *Stanford University Publications, Biological Sciences* 7(1): 1-284.
- Harvey, M.S. (1991). *Catalogue of the Pseudoscorpionida*. Manchester University Press: Manchester.
- Harvey, M.S. (1992). The phylogeny and systematics of the Pseudoscorpionida (Chelicerata: Arachnida). *Invertebrate Taxonomy* 6: 1373-1435.
- Judson, M.L.I. (1992). African Chelonethi. Studies on the systematics, biogeography and natural history of African pseudoscorpions (Arachnida). Ph.D. thesis, Department of Pure and Applied Biology, University of Leeds: Leeds.
- Mahnert, V. (2001). Cave-dwelling pseudoscorpions (Arachnida, Pseudoscorpiones) from Brazil. *Revue Suisse de Zoologie* 108: 95-148.
- Morikawa, K. (1960). Systematic studies of Japanese pseudoscorpions. *Memoirs of Ehime University* (2B) 4: 85-172.
- Muchmore, W.B. (1975). The genus *Lechytia* in the United States (Pseudoscorpionida, Chthoniidae). *Southwestern Naturalist* 20: 13-27.
- Muchmore, W.B. (2000). The Pseudoscorpionida of Hawaii Part I. Introduction and Chthonioidea. *Proceedings of the Entomological Society of Hawaii* 34: 147-162.
- Murthy, V.A. and Ananthkrishnan, T.N. (1977). Indian Chelonethi. *Oriental Insects Monograph* 4: 1-210.
- Schawaller, W. (1980). Fossile Chthoniidae in Dominikanischem Bernstein, mit phylogenetischen Anmerkungen (Stuttgarter Bernsteinsammlung: Arachnida, Pseudoscorpionidea). *Stuttgarter Beiträge zur Naturkunde (B)* 63: 1-19.
- Schawaller, W. (1987). Neue Pseudoscorpion-Funde aus dem Nepal-Himalaya, II (Arachnida: Pseudoscorpiones). *Senckenbergiana Biologica* 68: 199-221.
- Vitali-di Castri, V. (1984). Chthoniidae et Cheiridiidae (Pseudoscorpionida, Arachnida) des Petites Antilles. *Bulletin du Muséum National d'Histoire Naturelle, Paris* (4) 5: 1059-1078.

Manuscript received 11 November 2004; accepted 26 May 2005